

COURSE OUTLINE

(1) GENERAL

SCHOOL	Health Sciences		
ACADEMIC UNIT	Faculty of Medicine		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	IAY407	SEMESTER	D (4 th)
COURSE TITLE	From Genome to Evolution		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	WEEKLY TEACHING HOURS	CREDITS	
Lectures and bibliography presentations	3	2	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Special background		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes/English		
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/enrol/index.php?id=161		

(2) LEARNING OUTCOMES

<p>Learning outcomes <i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i> 		
<p>Students are expected to comprehend the basic concepts and genetic basis of the Theory of evolution and familiarize with the evolutionary aspects of biological processes associated with human physiology and disease.</p>		
<p>General Competences <i>Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i> </td> <td style="width: 50%; vertical-align: top;"> <i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>.....</i> <i>Others...</i> <i>.....</i> </td> </tr> </table>	<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>.....</i> <i>Others...</i> <i>.....</i>
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- Search for analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Respect for difference and multiculturalism
- Criticism and self-criticism
- Project planning and management

(3) SYLLABUS

- Introduction to the Theory of evolution, principles of evolution:
Development of the evolution theory, basic concepts, common ancestor, evolutionary trees, natural selection, genetic diversity, genetic drift, genetic basis of evolution.
- Evolution of the first genomes:
RNA world, chemical evolution, primordial genomes, primordial cells, origin of Eukarya.
- Genetic diversity and evolution:
Genetic variability (a) at the level of populations; (b) at the level of genomes; (c) and evolutionary change. Molecular and cellular mechanisms.
- Coevolution:
Basic concepts, definitions, coevolution types, Game theory and evolution, Red Queen concept, Black Queen concept, applications in Medicine. An interactive educational in-class activity (Coevolution games) for consolidation of the coevolution concept and its importance in maintenance of genetic variation and biodiversity. This educational game had been developed by the Coordinator of the elective course in the context of an educational research program for promoting the evolution concepts across educational levels (H.F.R.I. Science and Society, 2022-2024).
- Medicine and evolution, introduction to Evolutionary Medicine:
Basic approaches and themes of Evolutionary Medicine, evolutionary aspects of modern diseases.
- Preparation and presentation of students' short projects on evolution topics:
Bibliography themes based on a thematic database prepared by the course Coordinator with topics related to the current literature and applications of the Theory of evolution on understanding of human physiology and diseases. Each student undertakes one such project for study, preparation and presentation. Students prepare their projects with the consulting help of the Coordinator/instructor. The projects are presented at the end of the semester in an open-presentation format, with all students of the class participating in the relevant discussion afterwards.

Objectives

Introduction to Evolutionary Biology, with emphasis on the genetic and genomic basis of the Theory of evolution and its applications on biomedical sciences.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Teaching courses to small groups of students given by several instructors (academic personnel from different disciplines and research specialties).
USE OF INFORMATION AND	Powerpoint slides and videos are used in the lectures.

<p>COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>The powerpoint slides and videos presented, as well as complementary teaching material (links to important research articles or related textbooks, etc.), are freely accessible to the students through the e-course system of the University of Ioannina. The e-course system is also used for updates and communication with the students on several practical aspects of the teaching process and for questions-advice for the preparation of the students' project presentations or exams. E-mail addresses of the teaching staff are made available to students and are freely used as a means of communication. The student theme projects presented at the end of the semester are presented as ppt slides and finally archived (as pdf files) at the e-course page of each academic year for future reference.</p>																							
<p>TEACHING METHODS <i>The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	<table border="1"> <thead> <tr> <th data-bbox="628 732 963 763"><i>Activity</i></th> <th data-bbox="968 732 1289 763"><i>Semester workload</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="628 770 963 801">Lectures</td> <td data-bbox="968 770 1289 801">14</td> </tr> <tr> <td data-bbox="628 808 963 891">Analysis of bibliography and preparation of theme project for presentation</td> <td data-bbox="968 808 1289 891">10</td> </tr> <tr> <td data-bbox="628 898 963 981">Interactive teaching (educational game on Coevolution)</td> <td data-bbox="968 898 1289 981">3</td> </tr> <tr> <td data-bbox="628 987 963 1019">Project presentation</td> <td data-bbox="968 987 1289 1019">3</td> </tr> <tr> <td data-bbox="628 1025 963 1057"></td> <td data-bbox="968 1025 1289 1057"></td> </tr> <tr> <td data-bbox="628 1064 963 1095"></td> <td data-bbox="968 1064 1289 1095"></td> </tr> <tr> <td data-bbox="628 1102 963 1133"></td> <td data-bbox="968 1102 1289 1133"></td> </tr> <tr> <td data-bbox="628 1140 963 1171"></td> <td data-bbox="968 1140 1289 1171"></td> </tr> <tr> <td data-bbox="628 1178 963 1209"></td> <td data-bbox="968 1178 1289 1209"></td> </tr> <tr> <td data-bbox="628 1216 963 1247">Course total</td> <td data-bbox="968 1216 1289 1247">30</td> </tr> </tbody> </table>		<i>Activity</i>	<i>Semester workload</i>	Lectures	14	Analysis of bibliography and preparation of theme project for presentation	10	Interactive teaching (educational game on Coevolution)	3	Project presentation	3											Course total	30
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<p>STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Language of evaluation: Greek</p> <p>Evaluation through a combination of a final short written exam (20% of the final grade) and presentation of the theme project prepared by the student (80% of the final grade).</p> <p>The short written exam includes a weighted list of the following types of questions: Short-answer questions Open-ended questions Questions requiring critical thinking/interpretation Multiple-choice or double-choice (yes/no) questions</p> <p>The project presentations are implemented by each student in an open-presentation context, followed by discussion and questions on the topic raised by the coordinator/instructor and other students of the class.</p>																							

(5) ATTACHED BIBLIOGRAPHY

- Teaching – study material:

1. N. H. Barton, D. E. G. Briggs, J. A. Eisen, D. B. Goldstein, N. H. Patel, **Evolution**, *Cold Spring Harbor Laboratory Press*, New York, 2007.
2. A. M. Lesk, **Introduction to Genomics**, *Oxford University Press*, 2nd edition, 2012.
3. Additional bibliography on evolution themes and evolutionary medicine for further reading and selection of the project themes to be presented by the students can be found at the lesson e-course page: <http://ecourse.uoi.gr/enrol/index.php?id=161>
4. Presentations (pdf files) of students' projects from previous academic years.